

WHAT IS CLAIMED IS:

1. An optical device comprising:
 - 5 a TEC (Thermal-Diffusion Expanded Core) optical fiber including a first core, wherein a diameter of the first core at a first end of the TEC optical fiber is larger than the diameter of the first core in an unexpanded portion of the TEC optical fiber; and
 - 10 a focusing lens configured to focus light into the first end of the TEC optical fiber such that a light spot created by the focused light on a surface of the first end of the TEC optical fiber has a light spot diameter that is larger than the diameter of the first core in the unexpanded portion of the TEC optical fiber.
- 15 2. The optical device of claim 1, wherein the TEC optical fiber is comprised in an optical fiber pigtail that is permanently affixed in the optical device.
3. The optical device of claim 1, further comprising an active component configured
20 to output the light to the focusing lens.
4. The optical device of claim 3, wherein the active component comprises a laser diode.
- 25 5. The optical device of claim 1, further comprising a passive component configured to process the light and output the light to the focusing lens.
6. The optical device of claim 1, further comprising an additional TEC optical fiber
30 that includes a second core, wherein a diameter of the second core at a first end of the additional TEC optical fiber is larger than the diameter of the second core in an unexpanded portion of the additional TEC optical fiber.

7. The optical device of claim 6, wherein the additional TEC optical fiber is configured to input the light into the optical device from the first end of the additional TEC optical fiber.

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8. A method of operating an optical device comprising:

providing light to a lens within the optical device; and

10 the lens focusing the light into a first end of a TEC (Thermal-Diffusion Expanded Core) optical fiber having a first core and a first cladding, wherein a diameter of the first core at a first end of the TEC optical fiber is larger than the diameter of the first core in an unexpanded portion of the TEC optical fiber;

15 wherein a light spot created by said focusing on a surface of the first end of the TEC optical fiber has a light spot diameter that is larger than diameter of the first core in the unexpanded portion of the first core.

20 9. The method of claim 8, wherein the TEC optical fiber is comprised in an optical fiber pigtail that is permanently affixed in the optical device.

10. The method of claim 8, further comprising an active component outputting the light to the focusing lens.

25 11. The method of claim 10, wherein the active component comprises a laser diode.

12. The method of claim 8, further comprising a passive component processing the light and outputting the light to the lens.

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13. The method of claim 8, wherein an additional TEC optical fiber includes a second core, wherein a diameter of the second core at a first end of the second TEC optical fiber is larger than the diameter of the second core in an unexpanded portion of the second optical fiber, wherein the method further comprises the additional TEC optical fiber
5 outputting the light from the first end of the additional TEC optical fiber.

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